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Rapid process for making silica gel and silicate polymer and low density gels made thereby

Description of Technology: In the process of the present invention, at least one fluoroalkoxysilane is contacted with a solution comprising water. Upon standing for a short period of time, a silica gel or silicate polymer forms. No solvent or catalyst is required for this reaction to proceed in a rapid manner, but use of a solvent and/or catalyst is permissible. The reaction is rapid even under conditions of high dilution.

Patent Listing:

1. **US Patent No.** 6,168,773**,** Issued on January 2, 2001, "Rapid process for making silica gel and silicate polymer and low density gels made thereby"

http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&co1=AND&d=PTXT&s1=6,168,773.PN.&OS=PN/6,168,773&RS=PN/6,168,773

Market Potential: Inorganic gel can be generated from molecular precursors through room temperature hydrolytic and condensation sol-gel reactions. Such reactions generally require cosolvents for the essential reactants, water and the molecular precursor compound, such as a tetraalkoxysilane, and are catalyzed by either acid or base.

Very low density gels are useful as precursors to low density aerogels made by supercritical fluid drying and as separation media for large molecules such as proteins and polymers. Aerogels are the best acoustic and thermal insulating materials known. However, simple conventional gel precursors, such as tetramethoxysilane or tetraethoxysilane, are not useful direct sources of low density gels because of extremely long or infinite gelation times at very low concentrations.

There are no known processes for forming silica gel from a tetrafluoroalkoxysilane and water with or without the use of a catalyst.

Benefits:

- Forms silica gel from a tetrafluoroalkoxysilane and water

Applications:

- Aerogels

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